

REMARKS

Introduction

The Applicant would like to thank the Examiner for indicating that the subject matter of claims 8 and 9 define over the prior art of record. Specifically, the Examiner stated that claims 8 and 9 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

This Amendment is responsive to the December 27, 2007 Office Action. In the Office Action, claims 1-7 and 10-21 stand rejected. Claims 1 and 11 have been amended to add clarifying language. Support for the amendment to claims 1 and 11 can be found on page 10, lines 16-25 and page 11, lines 10-13 of the specification. Claims 6 and 17 have been amended to incorporate the features of claims 8 and 18, respectively. Accordingly, claims 8 and 18 have been cancelled. Further, claim 9 has been amended to depend from claim 6 and to correct a typographical error. Claims 19 and 20 have been amended to depend from claim 17. Claims 1-7, 9-17, and 19-21 are now pending.

No new matter has been introduced by the foregoing amendments.

Rejections Under 35 U.S.C. §103

Claims 1, 3-6, 10-15, 17, and 19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Publication No. 2004/0099608 to Leffler et al. in view of United States Patent Nos. 5,358,643 to McClintock and 4,085,028 to McCallum. Claims 2, 7, 16, 18, 20 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the combination of the Leffler publication, the McClintock patent and the McCallum patent in further view of United States Publication No. 2004/0106211 to Kauer et al.

The Leffler publication discloses a ballast water treatment system having a ballast tank (26), electrolysis cells (16), and a pump (unnumbered) (see Fig. 1). The Office Action relies upon the McClintock patent and the McCallum patent to teach a system having multiple pumps and a controller for supplying power to an electrolyzer, respectively. The Office Action further relies on the Kauer patent to disclose an NaOCl density detection sensor.

Amended claim 1 is directed to an apparatus for treating ballast water in a

ship, including a ballast tank installed in a lower portion of the ship for storing seawater, an electrolyzer connected with the ballast tank for electrolyzing the seawater, a first circulation pump installed between the ballast tank and the electrolyzer for allowing the ballast water to flow into the electrolyzer, a second circulation pump for discharging the electrolyzed seawater containing NaOCl from the electrolyzer to the ballast tank, and a controller controlling a direct-current voltage supply to the electrolyzer and controlling the circulation pumps so as to adjust an NaOCl density of the ballast water.

Amended claim 11 is directed to an apparatus for treating ballast water in a ship, including a ballast tank installed in a lower portion of the ship for storing seawater, an intake pump for taking in seawater and supplying the seawater to the ballast tank, an electrolyzer positioned between the ballast tank and the intake pump for electrolyzing the seawater supplied to the ballast tank from the intake pump, and a controller controlling a direct-current voltage supply to the electrolyzer and controlling the intake pump so as to adjust an NaOCl density of the seawater contained in the ballast tank.

The references cited in the Office Action fail to teach or suggest a controller for controlling a direct-current voltage supply to the electrolyzer and for controlling the circulation pumps or intake pump so as to adjust an NaOCl density of the ballast water as defined in claims 1 and 11. The McCallum patent discloses the use of full wave rectification, half wave rectification, and time proportioned electric current to adjust chlorination rather than controlling a direct-current voltage supply to the electrolyzer. Further, the McCallum patent specifically states "Because there is substantially no voltage or current control, shielding strips are required . . ." (see abstract). The Leffler publication and the McClintock patent fail to overcome these deficiencies.

Therefore, the combination of the Leffler publication, the McClintock patent, and the McCallum patent fail to render claims 1 and 11 obvious. Claims 2-5, 12-16, and 21 depend from, either directly or indirectly, and add further limitations to claims 1 and 11. Thus, claims 2-5, 12-16, and 21 are deemed to be in condition for allowance for all of the reasons set forth hereinabove.

Amended claim 17 is directed to a method for treating ballast water in a ship

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using electrolysis, including the steps of: taking in seawater into a ballast tank; passing the taken-in seawater through an electrolyzer where electrodes for electrolysis are installed to generate electrolyzed water containing NaOCl; allowing the electrolyzed water containing NaOCl to flow into the ballast tank; measuring an NaOCl density; adjusting, at the electrolyzer, a direct-current voltage and current; and controlling a ballast water density until the density reaches a required density by adjusting an intake amount of the seawater using an intake pump.

None of the references cited in the Office Action, however, teach or suggest a method for treating ballast water in a ship using electrolysis having the features of amended claim 17. Therefore, the combination of the Leffler publication, the McClintock patent, the McCallum patent, and the Kauer publication fail to render claim 17 obvious. Claims 19 and 20 depend from and add further limitations to claim 17. Thus, claims 19 and 20 are deemed to be in condition for allowance for all of the reasons set forth hereinabove

Furthermore, the Office Action at page 3 indicated that the subject matter of claim 8 defines over the prior art of record and would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Accordingly, claim 6 has been amended to incorporate the features of claim 8. Therefore, Applicants respectfully submit that claim 6 is in condition for allowance. Claims 7, 9, and 10 depend from and add further limitations to claim 6. Thus, claims 7, 9, and 10 are deemed to be in condition for allowance for the reasons set forth hereinabove.

Conclusion

In view of the foregoing amendments and comments, Applicants respectfully request reconsideration of the rejection of claims 1-7 and 10-21 and allowance of pending claims 1-7, 9-17, and 19-21.

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Should the Examiner have any questions regarding this information or wish to discuss this matter in further detail to advance prosecution, the Examiner is invited to contact Applicants' undersigned representative by telephone at the number provided below.

Respectfully submitted,
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